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Questions and Answers: Mosquito Control and Anvil Application To Reduce Risk of Eastern Equine Encephalitis

Q 1: What is Eastern equine encephalitis (EEE)?

Eastern equine encephalitis (EEE) is a rare but serious disease caused by a virus. The virus infects birds that live in freshwater swamps and is spread from bird to bird by infected mosquitoes. If a mosquito infected with the virus bites a horse or human, the animal or person can become sick. The risk of getting EEE is typically highest from late July through early September.

Q 2: Is EEE a serious health problem?

EEE can cause severe illness in any age group, however, people under age 15 are at particular risk. The mortality rate for humans who contract EEE is high and survivors often suffer severe neurological damage.

Q 3: Have any Massachusetts residents been diagnosed with EEE this year?

As of August 1, 2006, there have been no reported human cases of EEE in Massachusetts. However, because positive EEE mosquito pools have been found in human biting mosquitoes and infection of a horse in the same area has been identified, there is a higher risk of human cases.

Q 4: Where have positive mosquito pools been found?

As of August 2, 2006, four of the eight EEE (+) mosquito findings have been in mammal-biting mosquitoes. All four collections were from Plymouth County, with three from the town of Lakeville and one from the town of Plympton. This is an unusual finding, as the occurrence of EEE in mammal-biters is rare and tends to occur later in the season.

The occurrence of EEE virus in these mosquitoes increases the risk for human disease, because these mosquitoes are much more likely to bite people than the mosquitoes usually carrying EEE. Based on these positive findings and the fact that

mosquito pools show abundant numbers of mosquitoes and larvae counts in Plymouth County and that environmental conditions are optimal for continued mosquito breeding, a high risk of occurrence of human cases exists.

Q 5: What has been done to reduce risk of EEE?

Officials in affected areas have increased targeted ground-spraying of adult mosquitoes. Earlier efforts included targeting mosquitoes in the immature or larval state. In addition, recent efforts have been enhanced to provide educational information to residents in affected areas on: 1) source reduction (e.g., removal of potential breeding sites, such as garbage cans, flower pots, bird baths, discarded auto-tires or other containers that hold water); and 2) personal risk reduction (e.g., use of repellants, ensuring screens are in adequate repair, wearing clothing that covers your skin while outdoors).

Q 6: Why is aerial spraying of insecticides being considered now?

In situations of high risk of an outbreak of human disease, the Arbovirus Surveillance and Response plan recommends consideration of the use of adulticide spraying to reduce mosquito numbers in those specific areas of high risk. Despite ground-spraying efforts to date, mosquito numbers remain high. Many breeding areas of high concern are not accessible by truck mounted ground sprayers. Typically mosquitoes are most active and most likely to carry disease between late July and late September. If the weather is warm, it would be expected that more mosquitoes would be airborne. If the temperatures remain warm into the Fall, the risk period can extend as late as November.

Q 7: How would aerial spraying be conducted?

Aerial spraying is generally conducted during the early evening and night time hours (i.e., usually from dusk up to shortly after midnight) in areas of concern. Mosquito control professionals apply these pesticides as an ultra low volume (ULV) spray. ULV sprayers dispense very fine aerosol droplets that stay aloft and kill adult mosquitoes on contact.

Q 8: What pesticide product would be used in the aerial spraying?

The most preferable product to be used in aerial spraying is called Anvil. Anvil (or similar products) is the same product routinely used in ground spraying. Anvil contains sumithrin, which is a man-made pesticide product similar to the natural components of the chrysanthemum flower that is used to control mosquitoes in outdoor residential and recreational areas. Sumithrin can also be found in other pesticide products used indoors in pet shampoo and lice treatments and on pets to control ticks and insects, such as fleas and ants. Piperonyl butoxide is also an active ingredient in Anvil, acting to increase the ability of sumithrin to kill mosquitoes.

Q 9: Have other states applied pyrethroids to control mosquitoes?

Yes. A number of other states (e.g., New York, New Jersey, Illinois, Delaware, North Carolina, Arkansas, Florida, Alabama, Louisiana, Texas) have applied these products.

Q 10: What kinds of health problems can be associated with exposure to Anvil?

In occupational studies where significant exposures occurred, loss of coordination, tremors or tingling and numbness in areas of skin contact have been observed. However, with targeted and appropriate aerial spraying, a very low concentration (a maximum of 0.62 ounces active ingredient per acre) is used and exposure to levels that cause health problems are not expected.

Q 11: What health impacts among the general population can be expected with the aerial spraying of Anvil?

Due to the very low concentrations of Anvil used to control mosquitoes during aerial spraying, adverse health effects are not expected.

Q 12: Have studies been conducted on possible health effects following aerial spraying for mosquito control?

Yes. The U.S. Centers for Disease Control and Prevention (CDC) reported that when administered properly in a mosquito-control program, insecticides pose a low risk for acute, temporary health effects among persons in areas that are being sprayed and among workers handling and applying insecticides. In addition, CDC reported that ULV aerial and ground spraying of products similar to Anvil did not result in elevated levels of the pesticides in human tissue in the population living in areas sprayed.

Q 13: Can exposure to Anvil exacerbate pre-existing conditions?

Yes, for some people, short-term exposure at low levels may exacerbate existing respiratory conditions (e.g., asthma) or cause irritation of the eyes, skin, nose, throat or lungs. For these reasons, individuals should consider taking steps to minimize their exposure risk to Anvil if it is applied to control mosquitoes. You should call your doctor, go to your local emergency room, or call the Massachusetts Poison Control Center if you believe that you are experiencing any symptoms that may be related to pesticide exposure.

Q 14: Could there be health concerns if I am pregnant?

As with all chemical exposures, pregnant women should take care to avoid them. Sumithrin is unlikely to affect pregnancy outcomes in people as a result of the proposed aerial spraying. Although some effects occurred in laboratory animals that were given large amounts of sumithrin during pregnancy, these amounts far exceeded the amounts that individuals are likely to contact from the proposed aerial spraying of Anvil.

Q 15: Could the aerial spraying result in long-term health effects?

Sumithrin did not cause cancer in rodents when they were fed high levels for their lifetime. Experimental studies have reported that piperonyl butoxide causes liver tumors in rodents when they are fed high levels of piperonyl butoxide every day for a long period of time. The amount of piperonyl butoxide ingested by animals in these studies, however, far exceeds the amount humans might be exposed to as a result of the aerial use of Anvil to control mosquitoes. Although uncertainties exist, available information indicates that piperonyl butoxide is unlikely to cause cancer in humans as a result of its use to control mosquitoes.

Q 16: What are the environmental characteristics and impacts of sumithrin?

Sumithrin is rapidly inactivated and decomposed by exposure to light and air with a half-life of less than one day in the air, and on plants and other surfaces subject to sunlight. It does not dissolve easily in water, and is broken down by microorganisms in streams and water bodies that receive sunlight. Thus, residues in water would not be expected. Because of environmental fate and dilution characteristics and the fact that spraying does not occur over drinking water supply reservoirs, opportunities for exposure via drinking water are not expected. Anvil and other pyrethroid pesticides are toxic to terrestrial and aquatic invertebrates (e.g., dragonflies, beetles) and to fish. However, as the size of the fish pool or pond decreases the risk to the fish increases. The risks to large natural water bodies are minimal. Thus, you may want to cover a small ornamental fish pond in your yard during the night of spraying.

Q 17: What kinds of precautions are recommended if aerial spraying is scheduled in my area?

You can reduce/eliminate your exposure risk to the insecticide by staying indoors during spraying. Otherwise, no special precautions are recommended. The active ingredients of the pesticide product as it is used for aerial application for mosquito control generally break down quickly and do not leave a toxic residue.

Q 18: If individuals want to take extra steps to minimize or avoid exposure, what steps can be taken?

Common sense steps that can be followed in areas where aerial spraying is scheduled to take place include:

- If the immediate area of your home is being sprayed, keep widows closed and fans off. Shut off air conditioners unless they have a setting for recirculating indoor air. In very hot weather, make sure you open the windows or turn fans and air conditioners back on soon after the aerial spraying is completed.
- Rinse any homegrown fruits and vegetables with water as is typically done before cooking or eating them.
- Keep pets indoors during spraying to minimize their risk of exposure. Pets that remain outdoors could be exposed to small amounts of pyrethroids, but

would not be expected to experience adverse health effects from the spraying. Again, there are many pesticide products (e.g., flea collars, pet shampoo, dips) containing sumithrin that are used directly on pets to control ticks and insects.

- If skin or clothes or other items are exposed to the sprayed pesticide, wash with soap and water.
- If the spray gets in your eyes, immediately rinse them with water or eye drops, and call your doctor.
- Because Anvil breaks down quickly in sunlight and water, and considering dilution factors, no special precaution or waiting periods are recommended for outdoor swimming pools or beaches.

Q 19: If I am a beekeeper, should I take special precautions to protect them prior to or following aerial spraying?

No. Pyrethroid applications at night will not impact honeybee colonies as honeybees are inside the hives at night.

Q 20: Whom should I contact to find out whether or when aerial spraying will be conducted in my area?

Your local health department will be aware of any plans for aerial spraying. Announcements will be made though local media outlets (e.g., local cable).

Q 21: What if I think that I am experiencing an adverse reaction to pesticide spraying?

If you think that you are experiencing any health effects from pesticides, call your doctor or the Massachusetts Poison Control Center 800-222-1222 or go to your local Emergency Room. Toxicology staff at the MDPH can also be consulted by calling the WNV information line at 1-866-MASS-WNV (press 5 to be connected to the Center for Environmental Health), or by calling (617) 624-5757.

For more information please contact:

- **For general information about mosquito control**: visit the following webpage www.mass.gov/agr/mosquito/index.htm or contact the State Reclamation and Mosquito Control Board within the Massachusetts Department of Agricultural Resources at (617) 626-1777.

- **For questions about mosquito control in your city or town**: Contact your local board of health (listed in the telephone directory under "government")
- **For questions about aerial spraying and health effects of pesticides or to report any concerns about adverse reactions to pesticides**: MDPH, Center for Environmental Health at (617) 624-5757

- **For general questions about EEE:** MDPH, Division of Epidemiology and Immunization at 617-983-6800 or toll free at 1-866-MASS-WNV or online at www.mass.gov/dph/wnv/wnv1.htm. You may also contact your local board of health (listed in the telephone directory under "government").